IN THE CLAIMS:

Sub 01

1. An optical micro-electromechanical device, comprising:

a substrate; and

a mirror assembly suspended above said substrate, said mirror assembly including:

a torsional beam attached to said substrate,

a cantilever with a cantilever first end and a cantilever second end, said cantilever first end being attached to said torsional beam, said cantilever second end supporting a mirror head,

a connector attached to said torsional beam, and

a counterweight attached to said connector.

2. The optical micro-electromechanical device of claim 1 wherein said counterweight has a set of apertures formed therein.

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3. The optical micro-electromechanical device of claim 1 wherein a region of said substrate under said counterweight is configured as an isolation region.

4. The optical micro-electromechanical device of claim 3 wherein said isolation region is doped to provide electrical isolation between said counterweight and said isolation region.

5. The optical micro-electromechanical device of claim 3 wherein said isolation region includes a deposited passivation surface.

6. The optical micro-electromechanical device of claim 3 wherein said isolation region includes a trench to facilitate spatial isolation between said isolation region and said counterweight.

Sub 03

7. The optical micro-electromechanical device of claim 1 configured as a laser.

8. The optical micro-electromechanical device of claim 1 configured as an optical detector.

9. The optical micro-electromechanical device of claim 1 configured as an optical filter.

10. The optical micro-electromechanical device of claim 1 configured as an optical amplifier.

11. The optical micro-electromechanical device of claim 1 configured as an optical attenuator.

12. A method of operating an optical micro-electromechanical device, said method comprising the steps of:

positioning a mirror assembly over a substrate, said mirror assembling including a torsional beam attached to said substrate, a cantilever with a cantilever first end and a cantilever second end, said cantilever first end being attached to said torsional beam, said cantilever second end supporting a mirror head, a connector attached to said torsional beam, and a counterweight attached to said connector; and

applying an electrical bias to said substrate so as to create an electrostatic attraction between said counterweight and said substrate, which causes said torsional beam to rotate and thereby re-reposition said mirror head.

13. The method of claim 12 wherein said applying step includes the step of applying said electrical bias to said substrate so as to re-position said mirror head to create a red-shift of filter wavelength.

14. The method of claim 12 wherein said applying step includes the step of applying said electrical bias to said substrate so as to re-position said mirror head to create a blue-shift of filter wavelength.

15. The method of claim 12 wherein said positioning and applying steps are performed such that said mirror assembly operates as a laser.

16. The method of claim 12 wherein said positioning and applying steps are performed such that said mirror assembly operates as an optical detector.

17. The method of claim 12 wherein said positioning and applying steps are performed such that said mirror assembly operates as an optical filter.

18. The method of claim 12 wherein said positioning and applying steps are performed such that said mirror assembly operates as an optical amplifier.

19. The method of claim 12 wherein said positioning and applying steps are performed such that said mirror assembly operates as an optical attenuator.

20. The method of claim 12 further comprising the step of isolating said counterweight from said substrate.

21. The method of claim 20 wherein said isolating step includes the step of electrically isolating said counterweight from said substrate.

22. The method of claim 21 wherein said isolating step includes the step of electrically isolating said counterweight from said substrate through doping.

23. The method of claim 21 wherein said isolating step includes the step of electrically isolating said counterweight from said substrate with a passivation surface.

24. The method of claim 21 wherein said isolating step includes the step of spatially isolating said counterweight from said substrate.